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# Closed Reduction, Percutaneous Kirschner Wire Fixation and Cast Immobilisation of Distal Radius Fracture- A Prospective Observational Study

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**ABSTARCT**

**Background:** *Distal radius fractures are the most common type of orthopedic fracture. Some orthopedic surgeons prefer treatment by manipulation and plaster immobilization. Majority recommend operative intervention as the only methods to obtain anatomical reduction, and some have proposed that the best functional result will only be achieved by obtaining as near an anatomical radiographic result as possible.*

**Objectives:** *To study effectiveness of Kirschner wire fixation with and cast immobilization for patients with fracture of the distal radius.*

**Methodology:** *About 54 patients with with displaced fractures of the distal third of the radius with or without ulnar fractures were managed by closed reduction and percutaneous Kirschner-wire fixation. Interventions Kirschner wire fixation: wires are passed through the skin over the dorsal aspect of the distal radius and into the bone to hold the fracture in the correct anatomical position. After reduction and fixation the arm was immobilized in a cast above the elbow with the forearm and wrist in neutral position. Kirschner wire was removed after six weeks, followed by support with a wrist splint.*

**Results:** *The majority patients with distal radial fracture were men (75.9%). Majority of the patients (72.2%) sustained the injury due to fall. The side of involvement was more on right side (57.4%). Their average age was 29.3 years (18- 63 years). Antegrade intramedullary Kirschnerwire fixation was done for distal radial fractures in 70.4% of cases. Patients were evaluated clinically and radiologically after an average duration of follow-up of 9 months (due to time constrain for the study). In our study, according to AO classification, 29 cases were of Type A, 12 were of Type B and 3 were of Type C. The Anatomical*

*evaluation by Sarmiento's Criteria showed 20 (37.03%) patients with excellent, 14 patients with good, 8 with a fair and 2 with a poor result or outcome respectively. At final follow-up by 'The Gartland & Werley Criteria for Functional Outcome' 27 patients had excellent result, 12 had good result, 4 had fair result and 1 had a poor result.*

**Conclusion:** *This study demonstrates that percutaneous Kirschner wire pinning and cast immobilization is a minimally invasive technique that provides an effective means of maintaining the anatomical fracture reduction for distal radius fracture. The technique involves a minimal procedure that provides anatomic reduction, fracture fixation, and maintenance of reduction with an adequate method of immobilization.*

**Keywords:** *Distal radius fracture, Close reduction, Percutaneous Kirschner wire fixation, Cast immobilization.*

## INTRODUCTION

Up until a few decades ago, distal radius fractures were often casually regarded as 'Colles' fractures' [Figure 1]. The treatment was mainly manipulation and casting, since the generally accepted concept proposed by Abraham Colles in 1814[1], was that although these fractures would heal with deformity, the functional deficit would be acceptable. With better understanding of the various fracture types, classifications such as Frykman[2], Melone[3] and AO[4] were developed. There was a need for a better method of treatment after careful study of the individual fracture pattern.[5]

The radius is the larger of the two bones of the forearm. The end toward the wrist is called the distal end. A fracture of the distal radius occurs when the area of the radius near the wrist breaks. Distal radius fractures are very common. Fractures of the distal radius constitute one of the most common skeletal injuries treated by Orthopaedic surgeons. They make up 8%−15% of all bony injuries in adults.[6]

No consensus has been reached on classification systems, indications for surgery, or a particular choice of surgery since the orthopedic community first rejected Colles' contention that all distal radius fractures (DRFs) heal well. Gartland and Werley are generally credited with starting the revolution in 1951 with their paper examining more than 1000 DRFs, and Jupiter brought the discussion into the modern era with his 1986 paper in the *Journal of Bone and Joint Surgery* that emphasized the importance of reduction.[5]

The distal radial fracture is the most common fracture of the forearm and accounts for approximately 16% of all skeletal fractures. It is usually caused by a fall onto an outstretched hand (FOOSH). It can also result from direct impact or axial forces. The description of these fractures is based on distal radial angulation and displacement, intra-articular or extra-articular involvement, and associated anomalies of the ulnar or carpal bones. [7-14]

Posteroanterior (PA), lateral, and oblique radiographs of the injured wrist should be obtained.[15-19] Oblique views may reveal intra-articular involvement that is not apparent on the other views. The semi-supinated, oblique view demonstrates the dorsal facet of the lunate fossa, whereas the partially pronated, oblique PA view allows visualization of the radial styloid [Figure 2].[20]

Radial height is assessed on the PA view. It is a measurement between 2 parallel lines that are perpendicular to the long axis of the radius. One line is drawn on the articular surface of the radius, and the other is drawn at the tip of the radial styloid. The normal radial height is 9.9-17.3 mm.[21] Measurements of less than 9 mm in adults suggest the presence of comminuted or impacted fractures of the distal radius. Distal radial fractures that are not appropriately diagnosed with radiographic methods may result in increased morbidity when diagnosis is delayed. CT and MRI can be used to assess suspected occult fractures.[5]

Most authors advocate an anatomic reduction. The indications for reduction or operative treatment are not based solely on age but must be tailored to the individual patient. Management of DRFs has always been an area of intense research and

innovation. It has changed more rapidly in the past decade than in any previous two decades. Whereas percutaneous pinning and external fixation remain the mainstays of treatment throughout much of the world, with strong and somewhat idiosyncratic national trends attributable to the prominence of individual surgeons in those countries, volar fixed-angle plating has become popular and has dramatically shifted the landscape in several ways. [5, 22, 23]

To analyze the results of distal radial fractures treated with closed reduction, percutaneous pinning and cast immobilization in patients attending at Emergency and Orthopedics OPD of IMCHRC, Indore we studied the following

1. Functional outcome
2. Anatomical outcome

## MATERIALS & METHODS

This was a prospective observational study. About 54 patients with distal radial fractures presented to IMCHRC and Index Hospital between January 2015 and December 2016 were included in the study. Institutional Ethics Committee permission was sought before enrolment of study subjects. Individual patient's written consent was taken before enrollment in the study. A total of 58 were treated with closed reduction and percutaneous pinning with k-wires. About 54 patients, who fulfilled the inclusion criteria, were included in the study. The patients were followed up for an average period of 9 months. During the follow up, X-rays were taken and the patients were assessed.Anatomical analysis was done using 'Sarmiento's Modification of Lindstorm Criteria' and functional analysis was done using 'Sarmiento et al Modification of Demerit Point System of Gartland & Werley".

### Inclusion Criteria

1. Sustained a fracture of the distal radius (comminuted extra-articular and intra-articular)
2. They were over the age of 15 years
3. The patients presented within 2 weeks of injury
4. Given written informed consent

### Exclusion Criteria

1. Open fracture with a Gustillo-Anderson grading greater than 1
2. Fractures which required open reduction / ligamentotaxis (external fixator)

### The Surgical Procedure

The patient was positioned supine on the OT table, with the limb on a side table. Under axillary block or general anesthesia, the patient was placed in the supine position with the involved limb in traction with a finger trap through the index finger, and provided 8 to 10 lbs of counter traction with a water bottle. An accurate reduction in the fracture was the first step in the treatment plan. A neutral position of the wrist was desirable. The application of hyperextension and flexion maneuvers to break up the impaction was not recommended. With a dorsally displaced fracture, the reduction was performed by pushing the distal fragment distally and palmarly while holding the proximal fragment with the fingers around the forearm. The goal was to convert the dorsal angulation to a neutral position as well as to regain radial height.

After acceptable reduction of the fracture was achieved, two percutaneous K-wires were inserted through the radial styloid with the wrist in traction to maintain the reduction. Image intensification fluoroscopy was used to assist the insertion of the K-wires throughout the entire procedure. About 1.5 or 2 mm diameter K-wire was passed from the radial styloid crossing the fracture site obliquely to exit the dorsoulnar cortex of the radial shaft. Another K-wire was passed either parallel to the first wire or from the dorsoulnar aspect of the distal radius between the 4th and 5th extensor compartments and directed to engage the volar radial cortex of the proximal fragment. The exposed ends of the K-wires were then bent and cut. The pin sites were then dressed. Then a below elbow slab was applied on the volar surface with the wrist in neutral position. Smaller K wires for women and larger wires for men. The wire insertion was performed with a power K-wire driver to allow the surgeon to hold part of the reduction with one hand during K-wire insertion [Figure 3].

Sponge padding with an occlusive dressing was applied to prevent skin irritation. All procedures were carried out under full sterile preparation and draping. A well-fitted pin-in-plaster was applied for external immobilization.

The patients were hospitalized overnight to observe distal circulation of the fingers. In the post-operative period, the limb was kept strictly elevated for a period of 2 days. Patient was encouraged to begin active finger movements as soon as the effect of anaesthesia wore out. Patient at the end of 2 days asked to mobilize his elbow. At this time the pin sites were inspected and then dressed. If pin sites and mobilization were satisfactory, the patient was then discharged the next day.

The patients underwent follow-up at our outpatient clinic at 2-week intervals following hospital discharge. The healing of the fracture was assessed both clinically and radiographically at each follow-up. Patient was asked to review weekly for pin site inspection and follow up. At the end of four weeks a check X-ray was taken and if satisfactory signs of union were present, the pins were removed as was the slab and patient given a crepe bandage. He was then asked to mobilize the wrist gently at home. If at four weeks union was not satisfactory then, patient was followed up at five and then six weeks. At the end of which, the K-wires were removed and patient was asked to mobilize the wrist.

Usually, by 6 weeks, clinical and radiographic examination demonstrated progression of fracture healing. The percutaneous wires and the pin-in-plaster were usually removed after 6 weeks of immobilization on an outpatient basis without local anesthesia. The patient was reviewed at the end of a month after removal of pins as regard to range of motion of the wrist. If there was no satisfactory range of movements, patient was advised to visit the physiotherapist. The treatment complications were recorded. After bony union, patients underwent further follow-up for 1 year.

The residual deformity and the subjective evaluation were recorded in the same way as the original scoring system. The range of motion was measured using a goniometer to measure dorsal and volar flexion, radial and ulnar deviation, and supination and pronation, and the sum was calculated as the percentage of the unaffected wrist. The grip strength was measured with a gripper, and the result was classified using a nomogram. The final results of the patients with excellent and good functional outcome were considered satisfactory.

Pin tract infection severities were graded according to the modified Oppenheim's classification.[24]

Grade 1: Redness surrounding the pin tract with slight discharge

Grade 2: Soft tissue tenderness and redness with or without pus discharge

Grade 3: Grade 2 lesions not responding to antibiotics

Grade 4: Indicates involvement of surrounding soft tissue

Grade 5: Indicates radiological evidence of bone involvement

Grade 6: Indicates persistent sinus with sequestrum formation

**RESULTS**

All of the fractures healed in our study group. Fifty four patients with distal radial fractures fitting the inclusion criteria were treated by closed reduction and percutaneous fixation with K-wires and follow up done at regular intervals.

**Evaluation of anatomic results:** Anatomic result of each procedure was graded and compared by radiological criteria outlined by Lidstrom as modified by Sarmiento and Latta.[25]

**Evaluation of functional results:** Functional result of each procedure was evaluated and compared by functional criteria out lined by Gartland and Werley as modified by Sarmiento.

At the end of follow up the results were evaluated both radio logically and functionally with the help of prefixed criteria.[26]

The majority patients with distal radial fracture were men 41 (75.9%) [Table 2]. Majority of the patients (72.2%) sustained the injury due to fall. The side of involvement was more on right side

(57.4%). Their average age was 29.3 years (18-63 years) [Table 2]. Antegrade intramedullary Kirschner wire fixation was done for distal radial fractures in 70.4% of cases. Patients were evaluated clinically and radiologically after an average duration of follow-up of 9 months (due to time constrain for the study). In our study, according to AO classification, 29 cases were of Type A, 12 were of Type B and 3 were of Type C. The Anatomical evaluation by Sarmiento's Criteria showed 20 (37.03%) patients with excellent, 14 patients with good, 8 with a fair and 2 with a poor result or outcome respectively. At final follow-up by 'The Gartland & Werley Criteria for Functional Outcome' 27 patients had excellent result, 12 had good result, 4 had fair result and 1 had a poor result.

The majority were men (60.4%). Majority of the patients (69.8%) sustained the injury due to fall [Table 2].The side of involvement was nearly equal and that there was no predominance of the either sides.Majority of the patients (79.24%) did not have associated injuries [Table 2]. In our study, according to AO classification, 31 cases were of Type A, 17 were of Type B and 5 were of Type C [Table 3].

**Table 1:** Universal Classification of Distal Radial Fractures

| Classification | Description |
|---|---|
| I | Nonarticular, nondisplaced |
| II<br>A<br>B<br>C | <br>Nonarticular, displaced<br>Reducible, stable<br>Irreducible |
| III | Articular, non-displaced |
| IV<br>A<br>B<br>C<br>D | Articular, displaced<br>Reducible, stable<br>Reducible, unstable<br>Irreducible<br>Complex |

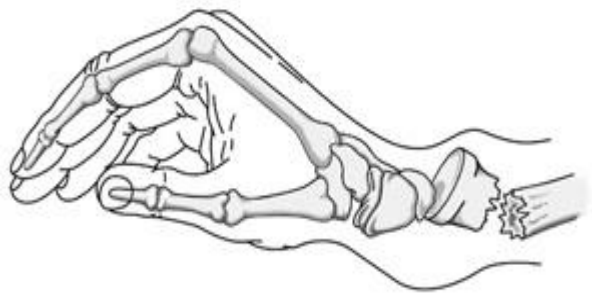

**Figure 1:** A Colles fracture occurs when the broken end of the radius tilts upward

**Figure 2:** PA view X-ray demonstrates a comminuted fracture of the distal radius. Note should be made of angulation and displacement, intra-articular or extra-articular involvement, and associated anomalies of the ulnar or carpal bones.

**Table 2:** Demographic and clinical characteristics of the study participants [n=54]

| Sex distribution | Number of cases | Percentage |
|---|---|---|
| Male | 41 | 75.9% |
| Female | 13 | 24.1% |
| Mode of Injury | | |
| Fall | 39 | 72.2% |
| RTA | 15 | 27.8% |
| Side Involved | | |
| Left | 23 | 42.6% |
| Right | 31 | 57.4% |
| Associated Injuries | | |
| No | 39 | 72.2% |
| Yes | 15 | 27.8% |

**Table 3:** Cases as per AO classification among study participants [N=54]

| AO type | Number of Cases | Percentage |
|---|---|---|
| A | 30 | 55.55% |
| B | 20 | 37.04% |
| C | 4 | 7.41% |

Table 3 shows that 55.55% of patients had Type A fracture pattern, 37.04% had Type B and 7.41% had Type C [Table 3].

**Table 4:** Results of the functional outcome analysis among study participants [N=54]

| Result | Subjective Evaluation | End Result |
|---|---|---|
| | Number of Cases | Number of Cases |
| Excellent | 27 (50%) | 28 (51.85%) |
| Good | 21 (38.88%) | 19 (35.19%) |
| Fair | 4 (7.41%) | 5 (9.26%) |
| Poor | 2 (3.7%) | 2 (3.7%) |

In our study, 51.85% of the cases showed "Excellent", 35.19% of the cases showed "Good", 9.26% cases showed "Fair" and only 3.7% cases showed "Poor" results [Table 4].

**Table 5:** Result according to AO classification in the present study [N=54]

| Result | Type A | Type B | Type C |
|---|---|---|---|
| | Number of Cases | Number of Cases | Number of Cases |
| Excellent | 16 | 11 | 1 |
| Good | 10 | 7 | 2 |
| Fair | 3 | 1 | 1 |
| Poor | 1 | 1 | 0 |

**Table 6:** Anatomical Outcome (SARMIENTO'S Criteria) in the present study [N=54]

| Result | Residual deformity | Loss of palmar tilt | Radial Shortening | Radial deviation | Mean |
|---|---|---|---|---|---|
| Excellent | 36 (66.7%) | 35 (64.8%) | 36 (66.7%) | 27 (50%) | 62.05% |
| Good | 4 (7.41%) | 13 (24.1%) | 16 (29.63%) | 21 (38.9%) | 25.01% |
| Fair | 13 (24.1%) | 4 (7.41%) | 2 (3.7%) | 5 (9.26%) | 11.18% |
| Poor | 01 (1.9%) | 02 (3.7%) | 0 | 01 (1.9%) | 1.89% |

The Anatomical evaluation by Sarmiento's Criteria showed 36 patients (66.7%) with "Excellent" result, 04 patients (7.41%) with "Good" result and 13 (24.1%) with a "Fair" result in respect to residual deformity post operative follow-up period [Table 6].

**Table 7:** Comparison of results between the Functional & Anatomical Outcome in the present study

| Result | Gartland & Werley | Sarmiento |
|---|---|---|
| Excellent | 51.85% | 62.05% |
| Good | 35.19% | 25.01% |
| Fair | 9.26% | 11.18% |
| Poor | 3.7% | 1.89% |

At final follow-up by 'The Gartland & Werley Criteria for Functional Outcome' 51.85% patients had "Excellent" result, 35.19% had "Good" result, 9.26% had "Fair" result and 3.7% had a "Poor" result [Table 7].

**Table 8:** Complications after procedure in the present study [N=54]

| | Number of Cases | Percentage |
|---|---|---|
| Pin Site Infection | 08 | 14.8% |
| Pin Loosening | 03 | 5.5% |

There were no major complication noted except for pin site infection in 8 (14.8%) cases and pin loosening in 03 (5.5%) cases [Table 8].

Assessment of postoperative radiographs showed that the average radial height was 9.97 mm (range=6.8–16.8 mm) and volar tilt was 3.96° (range=−3.9–12°) on immediate postoperative radiographs. At the time of removal of pin-in-plaster and percutaneous K-wires, the average radial height was 9.91 mm (range=5.3–16.8 mm), and the volar tilt was 3.93° (range=−8.3–12°). The results indicated that pin-in-plaster can provide adequate stability during the time of fracture healing.

**Figure 3A & 3B:** Immediate postoperative distal radius fracture with percutaneous K-wire fixation

## DISCUSSION

Distal radius fracture is a common injury [Figure 1]. The importance of anatomic reduction has been demonstrated by clinical studies as well as by laboratory assessment of force and stress loading across the radiocarpal joint. [27-29]

Intra-articular component in distal radius fractures usually signifies high-energy trauma occurring in young adults. High-energy injuries frequently

cause shear and impacted fractures of the articular surface of the distal aspect of the radius with displacement of the fracture fragments. The fracture pattern most commonly observed in geriatric age group is extra-articular while the high-energy intra-articular type is most frequent in young adult patients.[30]

Most of the fractures are caused by a fall on the outstretched hand with the wrist in dorsiflexion. The form and severity of fracture of distal radius as well as the concomitant injury of disco-ligamentary structures of the wrist also depend on the position of the wrist at the moment of hitting the ground. The width of this angle influences the localization of the fracture. Pronation, supination and abduction determine the direction of the force and the compression of carpus and different appearances of ligamentary injuries.[31, 32]

Distal radius fractures are the most common type of orthopedic fracture. Some surgeons advocate treatment by manipulation and plaster immobilization.[32] Many recommend operative intervention as the only methods to obtain anatomical reduction, and some have proposed that the best functional result will only be achieved by obtaining as near an anatomical radiographic result as possible. [29, 33, 34]

An accurate reduction in the fracture is the first step in the treatment of the distal radius fracture. After anatomic reduction in the fracture is achieved, many methods are available to maintain alignment and prevent repeat displacement. The methods of immobilization include casting, percutaneous pinning, external fixation, internal fixation with plate, or internal fixation combined with external fixation depending on the different types of fractures. Every method has its advantages and some limitations.[29]

The radius initially fails in tension on the volar aspect, with the fracture progressing dorsally where bending forces induce compressive stresses, resulting in dorsal comminution. Cancellous impaction of the metaphysis further compromises dorsal stability. Additional shearing forces influence the injury pattern, resulting in articular surface involvement.[35]

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The most common traditional treatment of distal radius fractures in osteoporotic patients is closed reduction and cast immobilization. Three-point fixation with a well-fitted cast is essential for adequate immobilization. However, extreme flexion should be avoided because carpal tunnel pressure will be increased. This is associated with increased wrist flexion and ulnar deviation when the distal fracture was immobilized with a cast.[29] Although cast immobilization alone avoids surgery and complications related to pin placement and pin removal, casts cannot maintain distraction to correct length or control the rotation of the distal fragment when comminution is present. [29, 35, 36]

The average age was 29.3 years (18-63 years). As age advance, there was osteoporosis and more chance of collapse of the fracture; also the elderly may had a harder time keeping to the rehabilitation protocol. In this study there were marginally more men than women. This might be accounted for by the fact that more involvement of men in outdoor activities, riding vehicles, heavy manual labour and willing to undergo surgical intervention. The mode of injury was fall on outstretched hand in 39 patients and RTA in the other 15 patients. RTAs were generally associated with greater forces and therefore more severe fracture pattern. RTA as a cause for injury was more common in the younger age group in this study. The predominant cause of distal radius fracture as fall on outstretched hand had been comparable to other studies.[37]

The decision to adopt surgical treatment often depends on timely identification of those at risk of

having poor outcome after closed reduction and casting. Some insights can be gained from patient factors and fracture characteristics mentioned above. A CT scan is invaluable in assessing the configuration of intra-articular fractures.[5, 37]

About 15 patients (27.8%of total) in our study had associated injuries. However patients with associated injuries in the same limb were not included in this study, as post op mobilization and thus scoring may had been compromised. Various studies had suggested that closed reduction and percutaneous pinning may not achieve a satisfactory result. Yet this study suggested that, satisfactory results may be achieved even with minimally comminuted fractures; provided adequate reduction can be achieved with closed reduction.[37]

In our study, The Anatomical evaluation by Sarmiento's Criteria showed 36 patients (66.7%) with "Excellent" result, 04 patients (7.41%) with "Good" result and 13 (24.1%) with a "Fair" result in respect to residual deformity post operative follow-up period. The anatomical outcome was evaluated using Sarmiento's modification of Lindstrom's criteria. The results of this study were comparable to the other studies that had been done previously.[37]

Study by Uzzaman KS *et al*[38] showed anatomical results (acc. To Sarmiento and Latta's score) was satisfactory in 80% cases of percutaneous K-wire fixation group whereas in conventional group it was 35%. Functional results (Sarmiento & Latta) in above study were satisfactory in 70% of percutaneous fixation group and 30% in conventional group. All these anatomical and functional results correlate with the study of Max Scheck – where satisfactory results were in 75% case[39] and Gartland and Werley's series – where the satisfactory result was 70%. In the present study, at final follow-up by 'The Gartland & Werley Criteria for Functional Outcome' 51.85% patients had "Excellent" result, 35.19% had "Good" result, 9.26% had "Fair" result and 3.7% had a "Poor" result.

Loss of reduction usually happens after 2 weeks of casting despite a perfect initial anatomic reduction.[40] Closed reduction and percutaneous pinning relies on intrafocal manipulation and pinning or manual traction, reduction, and pinning, to hold the fracture in an appropriate anatomic alignment. Clancey reported a 96.4% satisfactory result in 30 patients treated with percutaneous pinning if the articular surface of theradius was not comminuted into more than two fragments.[41]

There is an increasing popularity towards open reduction and plate fixation. After restoring the anatomy of the articular surface, a sufficiently stable construct also allows for early mobilisation. Closed reduction with percutaneous pinning is indicated in unstable fractures without significant comminution. The procedure is having different pitfalls like additional casting or external fixator often needed, pin-tract infections, tendon and superficial radial nerve impalement, and loss of reduction more likely when compared with plating.[5, 37]

Because K-wire fixation seldom provide sufficient stability to allow for early motion and often necessitate use of a cast or splint, the addition of two K-wires incorporated into the pin-in-plaster could increase stability of the fracture fixation. Extreme wrist flexion and ulnar deviation could be avoided with this technique.[5]

Percutaneous pinning with Kirschner wire is simple, minimally invasive, and prevents re-displacement of fracture fragments but it is limited to the extra-articular Colles fracture or fractures with minimal intra-articular involvement.[42] At present arthroscopic reduction is available for the management of distal radius fractures, which claim better results than the conventional treatment of such injuries.[43] There are few disadvantages of percutaneous pinning like the fear of pin tract infection, besides another minor procedure is required for their removal.[44]

Randomised trials [45-47] and a systematic review[48] showed that percutaneous pinning across fractures was associated with improved anatomical outcome and minor complications compared with casting. The improved radiological outcomes did

not necessarily translate to improved functional outcomes.

Metal pins are recommended; as biodegradable pins were shown to be associated with more complications.[49] Pin-tract infection is usually self-limiting. This can be reduced from 20% to 4% according to Hargreaves *et al*[50], by burying pins within the skin. However this means that further surgery will be required for removal.

The comparison between the results of the functional outcome[37, 51] and the anatomical outcome, confirmed what other studies had previously shown, that the functional result need not mirror the anatomical evaluation.

## CONCLUSION

Kirschner wires are percutaneous placed to stabilise fracture fragments before the wrist is further immobilised with a cast or external fixator. This permits direct fixation of major fragments in addition to ligamentotaxis. Surgical incision is minimal and implants are economical. The results of our study were in accordance with standard studies of distal radius fractures treated with closed reduction and percutaneou spinning. Kirschner wire fixation is cheaper and quicker to perform.

In conclusion, closed reduction, percutaneous Kirschner wire fixation and cast immobilisation is an excellent technique for both extra-articular and intra-articular fractures in cases without severe comminution of the distal radius. The technique involves a minimal procedure that provides anatomic reduction, fracture fixation, and maintenance of reduction with an adequate method of immobilization.

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**Conflict of Interest:** None declared

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